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Water insulating sheet used for landfill of waste - consisting of porous film of PTFE laminated with reinforcing sheet with air permeability and hydrophilic resin layer on at least one surface
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Abstract (Basic): JP 06047363 A

A water insulating and air permeable sheet is claimed of which at least one portion is made of porous film (A). At least one surface of (A) is laminated with a reinforcing sheet with air permeability. (A) is a elongated porous film made of polytetrafluoroethylene, and has a hydrophilic resin layer at least on one surface. A method of landfill of waste comprises covering waste with the sheet after every spreading and rolling compaction process of waste, which is further covered with soil.

USE/ADVANTAGE - Used for landfill of waste. Usually waste is covered with 50cm thickness soil after every spreading with 3m of spreading depth, but pptn. permeates into the waste, where the anaerobic decomposition takes place, that results in the generation gases (smells) and the contamination of soil and underground water. This method is able to insulate disposed waste from pptn. and prevent its anaerobic decomposition, besides water vapour and gases can diffuse into air. Dwg.0/2

File Segment: CPI
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(Title of the Invention)	Water Barrier Sheet for Waste Disposal by Landfill and Method for Waste Disposal by Landfill Using Same
(Number of Claims)	5
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Document Title: Specification

Title of the Invention Water Barrier Sheet for Waste Disposal by Landfill and Method for Waste Disposal by Landfill Using Same

Claims

(Claim 1) A water barrier sheet for waste disposal by landfill, comprising a waterproof, gas-permeable sheet provided in at least portions with a porous film.

(Claim 2) A water barrier sheet as defined in Claim 1, wherein at least one side of the porous film is partially bonded to a gas-permeable reinforcing sheet.

(Claim 3) A water barrier sheet as defined in Claim 1 or 2, wherein the porous film is a polytetrafluoroethylene drawn porous film.

(Claim 4) A water barrier sheet as defined in any of Claims 1, 2 or 3, wherein at least one side of the porous film is provided with a hydrophilic resin layer.

(Claim 5) A method for waste disposal by landfill, characterized by the fact that each time a prescribed amount of waste is covered with earth, a water barrier sheet as defined in any of Claims 1 through 4 is spread over the waste prior to covering it with earth.

Detailed Description of the Invention

(0001)

Field of Industrial Utilization

The present invention relates to a water barrier sheet for waste disposal by landfill and a method for waste disposal by landfill in which it is employed.

(0002)

Prior Art and Problems Pertaining Thereto

The sandwich method, which involves incorporating a 50 cm earth cover layer for each approximately 3 meter layer of waste during burial, is one landfill waste disposal method currently used.

However, with this conventional method, banking is performed by placing the earth directly on the waste layer. Thus, rainwater penetrates the waste layer, accelerating the production of gas due to anaerobic decomposition and resulting in leaching of harmful components from the waste by rainwater. This poses the risk of combustion, foul odor, groundwater contamination, contamination of water quality,

and other environmental problems during the burial process and subsequent to burial, making it impossible to use waste landfill sites for a period of several years to several decades after completion of the landfill.

(0003)

Problems Which the Invention Is Intended to Solve

The present invention solves the aforementioned problems seen with the prior art, and provides a method for waste disposal by landfill which does not pose an environmental hazard subsequent to burial, and a water barrier sheet employed in this method.

(0004)

Means Used to Solve the Aforementioned Problems

The inventors perfected the present invention as a result of painstaking research aimed at overcoming the aforementioned problems.

Specifically, the present invention provides a water barrier sheet for waste disposal by landfill which comprises a waterproof, gas-permeable sheet provided at least partially with a porous film.

The present invention also provides a method for waste disposal by landfill, characterized by the fact that each time a prescribed amount of waste is covered with earth, the aforementioned water barrier sheet is spread over the waste prior to covering it with earth.

(0005)

The water barrier sheet for waste disposal which pertains to the present invention is a waterproof, gas-permeable sheet provided in at least portions with a porous film. The porous film can be selected from polyolefin, polyurethane, polyester, polyether, polyvinyl chloride, cellulose, or other conventional known porous polymer films; drawn porous polytetrafluoroethylene (Japanese Patent Publications 56-45773 and 56-17216) are favorable. The average pore size of the porous film should be no more than 5 μm, and preferably no more than 1 μm so that it is both waterproof and gas-permeable. The porous film thickness is usually 10 to 100 μm, and preferably 30 to 80μm. In the present invention, the porous film is favorably lamination-bonded on one or both sides with a gas-permeable reinforcing sheet. The gas-permeable reinforcing sheet can be selected from any sheet material having good gas permeability and high strength; nonwoven fabric, woven fabric, net, waterproof paper, or the like may be used. When the reinforcing sheet is lamination-bonded to the porous film, it is favorable to carry out bonding by a partial bonding method. If the whole surface is bonded, gas permeability and moisture permeability will be impaired, making it

impossible to achieve smooth permeation by gas and water vapor emitted from the waste. Partial bonding methods include spot bonding, line bonding, pattern bonding, and the like. The adhesive should be applied such that the adhesive-coated area constitutes 5 to 95%, and preferably 10 to 80% of the entire area.

(0006)

It is favorable to provide at least one side of the porous film used in the present invention with a hydrophilic polymer layer. Conventional known hydrophilic polymers may be used; polyether urethane, perfluorosulfone resin, or the like are particularly favorable. When laminating a reinforcing sheet to the porous film, the reinforcing sheet should be laminated over the hydrophilic polymer layer. The hydrophilic polymer layer prevents degradation of the porous film due to contact with oils. The preferred thickness of the hydrophilic polymer layer is 1 to 50 μm, and preferably 5 to 20 μm.

(0007)

The water barrier sheet comprises a waterproof, gas-permeable sheet provided in at least portions with the aforementioned porous film. The waterproof, gas-permeable sheet may consist entirely of the aforementioned porous film, but this entails high cost, so it is more advantageous to attach the porous film to portions of a conventional water barrier sheet. The locations of and area covered by the porous film which is attached to the water barrier sheet can be selected as appropriate depending on the area of the waste layer and the amount of gas and water vapor released from the waste layer. Any material that is impermeable to water can be used as the water barrier sheet; synthetic rubber or synthetic resin films such as polyolefin resin sheeting or soft vinyl chloride sheeting is suitable for use. Methods for bonding the porous film to the water barrier sheet include methods employing adhesives, heat fusion, and the like; the heat fusion method is advantageous in terms of the durability of the bonded surface.

When using the water barrier sheet in waste disposal in a landfill during banking when burying prescribed amounts of waste, the water barrier sheet which pertains to the present invention is spread over the waste prior, and earth is then placed over the spread water barrier sheet.

(0008)

The present invention will be described below, referring to the appended drawings.

Figure 1 is a perspective view of principal components in one example of the waterproof, gas-permeable sheet which pertains to the present invention. A porous

film **1**, lamination-bonded on both sides with gas-permeable reinforcing sheets **2** and **3**, is superposed so as to cover cut-out sections of a water barrier sheet **4** provided with a plurality of cut-out sections. The porous films are bonded to the water barrier sheet **4** at their edges. When attaching the porous film **1** to the water barrier sheet **1** [sic], it is not necessary to provide the surface with a cut-out portion; a structure in which water barrier sheets are bonded to both sides of a porous sheet so that the central section consists of a porous film, a method whereby a plurality of permeation holes are made at specified locations on the water barrier sheet and porous films are superposed onto and bonded to the permeation hole sections, or other method may be used.

Figure 2 depicts the waterproof, gas-permeable sheet which pertains to the present invention used in waste disposal by landfill. The symbols indicate members identical to those in Figure 1.

(0009)

Merits of the Invention

The use of the waterproof, gas-permeable sheet which pertains to the present invention in waste disposal in landfills completely prevents the penetration of rainwater into the waste. Therefore, since the present invention prevents rainwater from entering the waste, the problems of accelerated anaerobic decomposition of the waste and of leaching of harmful components from the waste by rainwater are solved. Gas and water vapor emitted by the waste are rapidly released due to the gas permeability of the water barrier sheet which pertains to the present invention.

Brief Description of the Figures

Figure 1

Figure 1 is a perspective view of principal components in one example of the waterproof, gas-permeable sheet which pertains to the present invention.

Figure 2

Figure 2 depicts the waterproof, gas-permeable sheet which pertains to the present invention used in waste disposal by landfill.

Explanation of Symbols

1--porous film

2, **3**--gas-permeable reinforcing sheet

4--water barrier sheet

Document Title: Drawings

Figure 1

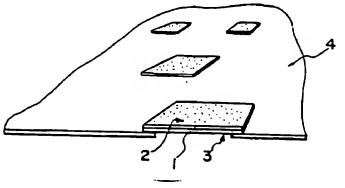
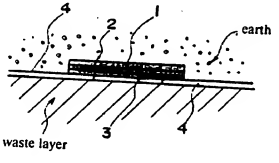


Figure 2



Document Title: Abstract

Abstract

Objective:

To provide a method for waste disposal by landfill that does not produce environmental problems after burial, and a water barrier sheet for use therein.

Structure:

A water barrier sheet for waste disposal by landfill, comprising a waterproof, gas-permeable sheet provided in at least portions with a porous film.

A method for waste disposal by landfill, characterized by the fact that during banking in disposal of prescribed amounts of waste, the aforementioned water barrier sheet is spread over the waste prior to banking.

Selected Figure: none